Zero Retries issue 0063 2022-09-09

Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience, that's free (as in beer) to subscribe.

About Zero Retries

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Pseudosponsor - AMSAT-DL Symposium

This issue of Zero Retries is pseudosponsored by the 2023 AMSAT-DL Symposium (and flea market and general meeting) on Saturday 2022-09-10 at Radome of the Bochum Observatory, Association headquarters of AMSAT Germany, Obernbaakstraße 6, 44797 Bochum, Germany.

*What a **cool** venue!*

Request To Send

Countdown to Digital Communications Conference 2022 - September 16-18, in Charlotte, North Carolina, USA:
~~**10**~~ ~~**09**~~ ~~**08**~~ ~~**07**~~ ~~**06**~~ ~~**05**~~ ~~**04**~~ ~~**03**~~ ~~**02**~~ **01** week…

At the end of the article in last issue - New Era About to Dawn for Personal Satellite Communications I said:

> It's a bit early to announce details, but these developments have accelerated my plans for a new paid subscription newsletter that will focus on bleeding edge wireless technologies such as this. Look for that new newsletter later in 2022.

Apologies to Zero Retries readers that this blurb caused some confusion. To be clear, the subject matter of this new newsletter will be *commercial* bleeding edge wireless technologies, not Amateur Radio. It will be an additional newsletter, not affecting Zero Retries.

It's an interesting moment in telecommunications - as the Apple story illustrates, the division between terrestrial wireless technology and satellite wireless technology are about to blur and compete like never before. Thus, now seems an opportune time to offer a completely independent perspective.

de Steve N8GNJ

Starlink and Emergency Communications

I wrote this 1200 word article early in the week and when I reread it, it struck me that if I had to start the article with this disclaimer:

> *Zero Retries is not going to morph into the Starlink fanboy newsletter (really!)*

… that article probably shouldn't be in Zero Retries. Doubly so because an Apple announcement this week also involved (non Amateur Radio) satellite communications which I felt merited a mention in Zero Retries due to the unique technology behind that feature. Thus I decided to move the Starlink article to my blog Superpacket - Starlink and Emergency Communications, with this explanation:

> *Initially, I wrote this for my newsletter Zero Retries 0063 (will publish Friday 2022-09-09 at 15:30 Pacific), but to avoid "Starlink isn't Amateur Radio fatigue" in the Zero Retries readership, I decided to move the article here and reference it in Zero Retries 0063 as optional reading. I believe that Starlink is poised to become a significant influence on Amateur Radio's traditional role of providing emergency communications, thus this discussion is appropriate for an Amateur Radio audience.*

Apple iPhone 14 Features Satellite Communication

To answer a likely question in advance, I have two primary reasons for putting this story in

Zero Retries. First, it's new, cool, and interesting. Second, it's relevant to Amateur Radio. How? There are going to be a lot of iPhone users that think that they can buy an iPhone 14, go traipsing off into the wilds, confident that if they do get into trouble, they can easily summon help with their iPhone 14. If they have an acquaintance or family member that's an Amateur Radio Operator, it's likely to come up "I can call for help anywhere with my iPhone 14 - no Amateur Radio needed!" The reality… isn't quite up to that perception.

During the reveal of the Apple iPhone 14 product line on 2022-09-07 (titled *Far out*.), Apple debuted a new feature - **Emergency SOS Via Satellite**.

To me as an Amateur Radio Operator, the name of this feature is a bit funny, and clunky. *Emergency* SOS? Since when is an "SOS" *not* an emergency? Then there's the choice of name of SOS… which despite popular perception that it stands for Save Our Souls (it doesn't), was chosen because it's easy to send *via Morse Code*:

• • • (S) — — — (O) • • • (S)

The voice equivalent is, of course, the word ***MAYDAY!*** But, I digress.

Although some type of satellite connectivity was widely expected in conjunction with the newest iPhones, the details of the new feature were more modest and more interesting than expected:

- Apple didn't name the satellite system used for this new feature - Globalstar, but they didn't have to. Space Explored had an interesting mention about Apple's use of the Globalstar system:
  In an SEC filing released during Apple's "Far Out" event, Globalstar plans to allocate 85% of its current and future network capacity to Apple for this service.
  That seems to indicate that Apple and Globalstar expect this new feature to be widely used!

- As the name implies, the feature is almost entirely limited to summoning help when there is no terrestrial wireless network connectivity. You cannot send text messages, photos, etc. but you can share your location via the (updated) "Find My" app.

- The new radio and antenna for the satellite connectivity is internal to the phone - no "bulky external antenna" (that would mar the esthetics of the sleek iPhone). Thus the signals to and from the satellite is very weak and the resulting data rate is very slow. With clever software, the app guides the user to keep the iPhone pointed at a satellite for as little as fifteen seconds (clear sky), or as long as a few minutes (light foliage), to maximize the signal strength and best (but still slow) data rate. Engadget had some good app screenshots.

- To minimize the amount of data required to transmit, prior to attempting transmission, the app works through a menu of the most likely scenarios. The first question is "What's the emergency"? and the choices include "Vehicle Issue, Sickness or Injury, etc." Then that information, along with your location, is compressed, then transmitted.

Then it gets interesting. There are five elements in Apple's system for getting help for an

iPhone user:

- iPhone
- Satellite
- Ground Station
- Relay Center
- Emergency Services

The Relay Center is key to making this work universally. If Apple determines, from your location, that the most appropriate Emergency Service Provider (ESP) supports text messaging, it will send the iPhone user's information direct to that ESP. If the ESP only supports voice calls, the Relay Center will call the ESP on the iPhone user's behalf and relay the information via voice.

After the information is transmitted, there is an acknowledgement message sent to the iPhone user. In the video, the message was *Emergency SOS - Responders have been notified. Stay where you are*.

Because this is a hardware feature - a new radio and antenna for Globalstar's unique spectrum (just above 2.4 GHz), only iPhone 14 (and later) models can use this feature. Apple said that the feature will be "free, for two years".

Thus, "Emergency SOS Via Satellite" on the iPhone 14 is, in my terminology, "connectivity of last resort". It's not much competition for satellite phones, or dedicated emergency satellite devices such as the Spot Satellite Messenger for those that want to ensure that they will be able to get help and communicate beyond the range of terrestrial cellular systems. But, in the end, Emergency SOS Via Satellite is, at least, *something*, for those who don't want to invest in Spot Satellite Messengers and find themselves in a bind with nothing but their iPhone 14.

Conclusions… I have a few... This "first steps" feature harkens back to the early days of the iPhone, when it was severely limited by AT&T's fledgling 3G service. For the moment, this feature is only available in the US and Canada. I expect this feature to rapidly mature, in software, iPhone hardware, and especially the satellite constellation. In addition to Globalstar allocating "85% of current and future network capacity to Apple", Apple has been working behind the scenes to enhance Globalstar's capabilities, including (reportedly) spending $327 million for 17 new satellites. It's not characteristic of Apple to spend that much money (remember, it also has to create, or at least fund, a Relay Center) without such expenditures being part of a larger, long term plan.

Having watched Apple's slow… then fast… approach to new technologies, I'm guessing that "Emergency SOS Via Satellite" is just the beginning of a series of satellite communications features, including (non-emergency) text messaging and (likely, low resolution) image transmission. Also, it's my guess that "Emergency SOS Via Satellite" will become a free feature, and Apple will fund the costs of satellite operations with fees for text messaging and image transmission via satellite.

I also think it likely, to the point of almost-total certainty, that Apple will eventually buy Globalstar, and operate it as a division, continuing to provide services to legacy Globalstar customers. That would have the benefit of Apple taking title to Globalstar's (worldwide) exclusive spectrum allocation.

And, for those who won't touch an iPhone even with this "connectivity of last resort", there *is* an alternative device with "similar" capabilities that was announced 2022-09-06.

Update - Turns out, there's a very cool postscript to this story that involves Amateur Radio technological innovation. But, there's no *space* 😐 for that story this week.

Disclaimer - I'm a (very, very minor) Apple stockholder.

Paul Elliott WB6CXC Drift Buoy Telemetry

This has been pending ever since WB6CXC offered some great comments in Zero Retries 0051 reminding me of his ongoing project. I'm glad to finally get this into Zero Retries.

One of the benefits of living in the far Northwest corner of Washington is the proximity to three concentrations of bright, capable people. The first is, of course, the Seattle metro area. The second is Bellingham (which I've written about previously).

Then, there are the techie denizens of the San Juan Islands. Some really amazing, capable people have retreated to island life, but still enjoy exercising their technical chops, including Amateur Radio. I found the SJI crowd so fascinating that I joined the San Juan County Amateur Radio Society (SJCARS) despite being an "off islander". I enjoyed attending SJCARS monthly meetings, commuting via Washington State Ferry, until COVID-19 shut everything down and made chaos of the ferry schedules.

One such San Juan Islander is Paul Elliott WB6CXC, whose current passion is designing a "drift buoy" that will transmit telemetry via Amateur Radio. Paul did a presentation at the 2021 MicroHAMS Digital Conference which I found fascinating. The subject of the presentation was "From Buoys to Turn Island Systems (and Back Again?)" - video of Paul's presentation.

Brief synopsis of Paul's project (cobbled together from Paul's info):

> I wanted to design [a telemetry drift-buoy] and set it free to roam the oceans of the world (and I still want to!) The buoy will have a low-power (<10W) transmitter, sending data in the HF ham bands, probably 30 meters (10 MHz.)
>
> In order for this to work, there needs to be a network of receivers that will pick up these transmissions and forward the data back to me, or at least to a place where it can be retrieved.
>
> HF APRS, and WSPR were possible candidates, but each had serious drawbacks. JS8 / JS8-Call has now come on the scene in a big way, and looks like a winner. JS8Call was created for human keyboard-keyboard contacts, but it also has the

> necessary fundamental characteristics to provide a reliable method for low-speed digital communications of arbitrary data.
>
> JS8call, in addition to keyboard chatting, also provides a one-way APRS gateway. You can send position and status reports, email, phone-text messages, etc to APRS and it gets processed as regular APRS stuff. I have two JS8 rcv-only stations (SDR, RPi, 30 meters and 40 meters, one setup in California and the other in Washington), that receive and forward to APRS. The robust (but slow) JS8/FT8 coding and protocol have some real advantages over more traditional ACK/NAK services.

Thus Paul is busy designing not just the telemetry transmitter for the buoy, but also a low cost custom telemetry receiver system that can be located anywhere in the world (that has power and Internet access), and the protocols.

Paul continues to work on the project. On Paul's blog, Fun with JS8 on 2022-04-22, he said:

> It's been a while, but I am returning to the Drift Buoy, and using the JS8 APRS interface for the telemetry. Things to work out:
>
> - Physical packaging
> - Solar / battery / power control
> - QRP transmitter power-stage design
> - Ultra-short antenna matching
> - uController and transmitter synthesis/driver
> - GPS, environmental sensors
> - Program that builds JS8 frames

Paul's project is just another example of *technological innovation in Amateur Radio*.

ZR > BEACON

- New Book - Playing With Meteors - **Exploring the Universe With Amateur Radio**
  Wouldn't it be a blast to be a master of technology rather than to be at its mercy? Or better yet, to actually create the next new thing? While it's true that a lot of what we consider high-tech involves computer technology, an equal or greater part of the next new thing is going to involve wireless, also known as radio. In fact, or entire universe is connected by radio, and the entire universe is the radio amateur's sandbox. In Playing With Meteors, author Eric Nichols takes you on a tour of the opportunities that amateur radio can bring you, and how you can leverage the knowledge you gain in "hobby radio" to a career in hi-tech, or just to being smarter than your "smart devices".
  I'm always on the lookout for new books that *touch on Amateur Radio*, but aren't written

for Amateur Radio Operators. Thus this one looks interesting. I may receive a review copy, but if that doesn't happen I'll just order one within the next few weeks.

- Your ARDC Grant, The IRS, and The Public Support Test
  Bruce Perens K6BP sometimes steps up and says things that need to be said:
  By now, Amateur Radio organizations and others know about ARDC and their grant program. I'm going to discuss an IRS rule that will be a problem you must navigate if you are a 501(c)3 in the US and receive a large grant from ARDC.

- **Hackaday Triple Play**
  Hackaday continues to amaze me with both hosting and spotting these great radio technology projects that make learning about radio technology feel approachable if you have even a little bit of technical background. Sometimes Hackaday articles are a little… "relaxed in their interpretation of applicable regulations", but you can't deny the enthusiasm.

  - Project Boondock Echo - *Remote Radio Message Recording, Queueing, and Transmission (for Emergency Communications).*

  - Simple Breadboard SDR for Shortwave - *One of the best ways to learn about radios is to build your own, even in the age of cheap SDR dongles.*

  - An Amateur Radio Repeater Using an RTL-SDR and a Raspberry Pi - *What if you fancy setting up a simple repeater and you have neither a shed full of old radios or a hotline to the sales department of a large Japanese manufacturer? If you are Anton Janovsky, ZR6AIC, you make your own low-powered repeater using an RTL-SDR, a low-pass filter, and a Raspberry Pi.*

- Amateur Radio Public Seismic Network
  Although this doesn't seem to be an active project, it's cool that it existed at all. This seems a great capability to add to Ham Radio Science Citizen Investigation (HamSCI)'s research. Lightning detection would be another cool addition to HamSCI (though the primary contact for the Worldwide Lightning Location Network didn't respond an email query).

- Play HAMWORD for fun and practice with Winlink.
  Created by Mark Kleine, N5HZR, Hamword is a Winlink-based game that mimics the popular five-letter word guessing game, Wordle. This game allows hams to practice their Winlink skills while having fun guessing an unknown five-letter word.

- Chasing Weather Balloons With Software-Defined Radio
  How to hunt for downed radiosonde beacons with a cheap SDR receiver in Institute of Electrical and Electronic Engineers (IEEE) Spectrum magazine (online).

- Radio Shack Catalogs
  For those of us of a certain vintage with nostalgia for Radio Shack. I found this particular site to be a bit annoying as it's clunky and gimmicky (at least in my preferred browser - Safari), such as page turn noises. Of course there's an ad running below the catalog pages you're viewing. I prefer the cleaner, non-commercial, but less organized Radio Shack

Catalog collection on the Internet Archive.
My thanks to Peter Dahl WA7FUS for the pointer to the first link.

Zero Retries Sponsorships

The Zero Retries sponsorship model is *evolving*, but it's initially inspired by the Daring Fireball blog's sponsorship model (other than this sponsorship cost). Some initial points:

Sponsorship of Zero Retries is only available to "Zero Retries Interesting" companies, organizations, individuals, and projects. Ideally, a Zero Retries sponsor is involved in Amateur Radio, but that's not an absolute requirement. If an individual or company would like to sponsor Zero Retries, but prefer to remain anonymous, that's acceptable, but the "Zero Retries Interesting" criteria still apply.

- Sponsorships are limited to a *brief* mention in Zero Retries - a few sentences at most (but prominently displayed). Example - "WhizzyPacket is proud to sponsor this week's Zero Retries". More targeted sponsorship messages are acceptable, such as "WhizzyPacket is looking for a few good engineers - click here".

- A sponsorship is for *one* weekly issue of Zero Retries and is exclusive - one sponsor per week. Sequential sponsorships are available - as much as three months of sponsorship is acceptable. Longer than three months, let's discuss it.

- Lastly, although it kind of defeats the overt purpose of sponsorship, if a *Zero Retries Interesting company, organization, individual, or project cannot afford to pay for a sponsorship*, but wants / needs to "get the word out", Zero Retries can probably work something out. In fact, if there are gaps in sponsorships, I'll probably create some gratis sponsorship messages.

If you are interested in sponsoring Zero Retries, please reach out - it's early days. More importantly, if you know of a company, organization, project, or individual that you think could / would / should sponsor Zero Retries, *please point out Zero Retries to that entity*.

Zero Retries Poll - DCC 2022

Q. Are you participating in or at least looking forward to DCC 2022?
7 votes were cast - *you're an excited bunch!*

Yes - excited! 86%

No - Yawn. 14%

New poll - see the Starlink article above.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out **Join the Fun on Amateur Radio** for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- Pseudostaffer Dan Romanchik KB6NU for continuing to spot, and write about "Zero Retries Interesting" items on his blog that I don't spot on my own.
- Amateur Radio Weekly and Southgate Amateur Radio News consistently surface "Zero Retries Interesting" stories.
- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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Subscribe now

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Zero Retries is on Twitter @ZeroRetries - just click:

Zero Retries on Twitter

Please tell your friends and co-conspirators about Zero Retries - just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy; yes, you guessed it… just click:

Leave a comment

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More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*

- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham, Washington, USA
2022-09-09

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